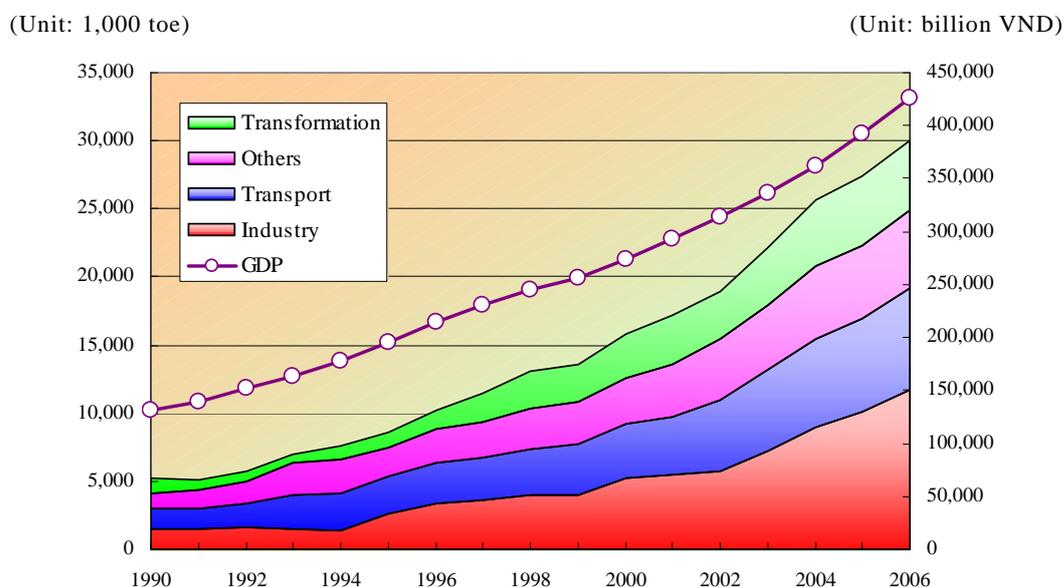


Energy Sector Situation in Vietnam (Summary)

By Shinji Omoteyama, Director, Planning & Administration

While the Vietnamese economy has grown fast over recent years, energy demand has expanded even faster than the economy. GDP per capita of Vietnam reached \$724 in 2006, though the country is still among the late developing group of the ASEAN countries. Annual energy consumption per capita is also small with 0.3 ton oil equivalent compared with the ASEAN countries. Vietnam has rich energy resources such as coal, oil, natural gas, hydropower and renewable energies, maintaining energy self-sufficiency. Vietnam is net energy export country right now.

However, according to high economic growth, energy demand will increase rapidly and energy demand will exceed domestic energy supply capability in the future. Energy demand in Vietnam will increase at 2.5 times in 2015 and 5 times in 2025 compared with present consumption level even allowing promotion of energy conservation. Therefore, after 2015, energy supply structure in Vietnam will be changed dramatically.



Source: Information from energy supply companies

As Vietnam has no oil refineries and depends on imports from the international market for petroleum product supply, prices of these products in the country are based on international levels. But domestic coal and gas prices for power plants are set at lower levels. In 2006, coal prices for domestic power plants stood at some \$20 per ton against export prices around \$35. Associated gas prices are separated from natural gas prices. Domestic gas prices for power plants are far lower than the international standard of \$7-8/mmBtu. Domestic coal prices for power plants, though planned to shift to market levels, are now 30% lower than domestic market prices and 50% less than export prices. Electricity prices are limited under government policy to as low as \$0.05/kWh on average.

Energy Sector Situation in Vietnam

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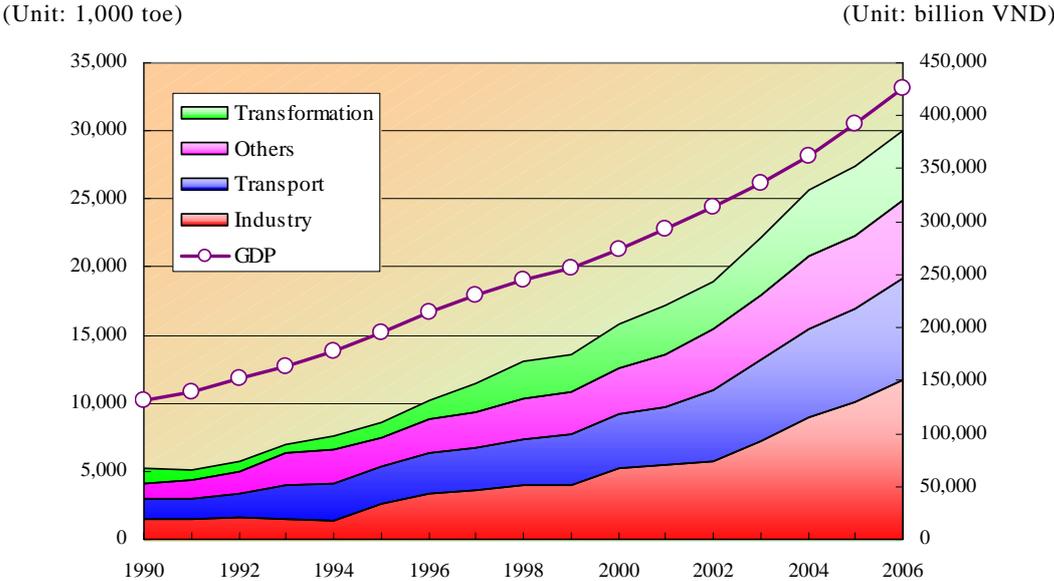
1. Energy Supply/Demand Overview

1.1 Energy Supply/Demand Changes

While the Vietnamese economy has grown fast over recent years, energy demand has expanded even faster than the economy. Energy demand increased from 5.187 million toe (tons oil equivalent) in 1990 to 13.128 million toe, indicating an average annual growth rate of 12.3%. During the period, the GDP elasticity of energy demand reached to 1.53 (12.3/8.0). After slowing down on the Asian currency crisis in 1999, energy demand between 2000 and 2006 scored an average annual growth rate of 12.0%, close to the level before the crisis. The GDP elasticity of energy demand during the period stood at 1.60 (12.0/7.5). This indicates that energy demand grew faster than the economy. In some single years, the GDP elasticity of energy demand slipped below 1. On a medium-term (five to 10 years) basis, the elasticity has been considerably high.

During the 16 years from 1990, energy consumption increased 5.8-fold from 5.187 million toe to 30.026 million toe. In 1990, the industrial sector accounted for 36% of energy demand, the transportation sector for 36% and other sectors for 28%. These shares changed to the respective levels of 47%, 30% and 23% in 2006. While the industrial sector’s share of total energy demand expanded fast, the shares for the transportation and other sectors shrank. The fast energy demand expansion reflected the industrial sector’s robust development. Energy demand growth in the other sectors was relatively slower. Nevertheless, energy consumption scored double-digit growth in all sectors, reflecting rapid growth of the Vietnamese economy.

Figure 1 Economic Development and Energy Demand Trend in Vietnam



Source: Information from energy supply companies

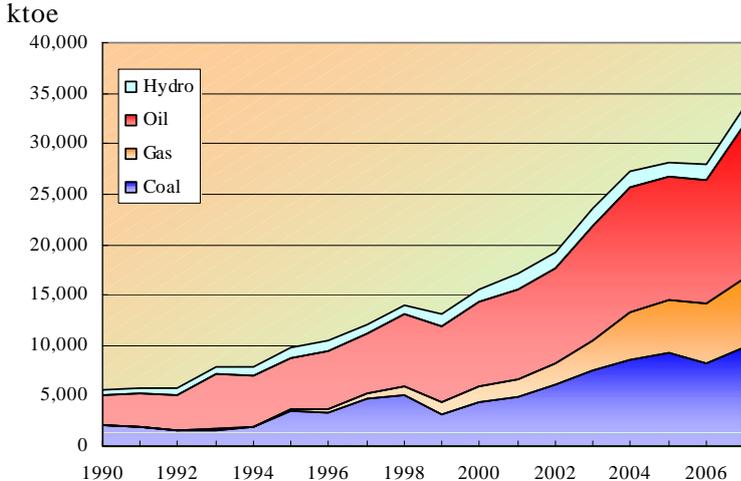
GDP per capita of Vietnam reached \$724 in 2006, though the country is still among the late developing group of the ASEAN countries. Annual energy consumption per capita is also small with 0.3 ton oil equivalent compared with the ASEAN countries. Vietnam has rich energy resources such as coal, oil, natural gas, hydropower and renewable energies, maintaining energy self-sufficiency. Vietnam is net energy export country right now.

However, according to high economic growth, energy demand will increase rapidly and energy demand will exceed domestic energy supply capability in the future. Energy demand in Vietnam will increase at 2.5 times in 2015 and 5 times in 2025 compared with present consumption level even allowing promotion of energy conservation. Therefore, after 2015, energy supply structure in Vietnam will be changed dramatically.

1.2 Energy Supply

While commercial energy consumption in Vietnam has been increasing over recent years, conventional renewable energy consumption for non-commercial purposes has still been accounting for nearly 40% of total energy consumption. This means that commercial energy demand has great growth potential. From 1995 to 2007, primary energy supply expanded at an average annual rate of 11%. Particularly, associated gas consumption for power plants increased. Coal and petroleum products are consumed mainly in the industrial and transportation sectors. Vietnam is a net oil exporter, with oil exports contributing to its foreign currency revenues. Oil, natural gas, coal, hydroelectric and other energy development projects have been smoothly implemented so far. But some concerns have emerged recently about the maintenance of crude oil production levels and natural gas and coal supply meeting rising demand. Meanwhile, Vietnam is considering the expansion or construction of hydroelectric and nuclear power plants, thermal power generation using imported coal, and electricity import.

Figure 2 Primary Energy Supply Trends



Source: Vietnam Energy Institute

1.3 Energy Prices

As Vietnam has no oil refineries and depends on imports from the international market for petroleum product supply, prices of oil products in the country are based on international levels. But domestic coal and natural gas prices for power plants are set at lower levels. In 2006, coal price for domestic power plants stood at some \$20 per ton against export price around \$35. Associated gas price is separated from natural gas prices. Domestic gas prices for power plants are far lower than the international standard of \$7-8/mmBtu. Domestic coal price for power plants, though planned to shift to market levels, is now 30% lower than domestic market price and 50% less than export price. Electricity prices are limited under government policy to as low as \$0.05/kWh on average.

Vietnam is expected to become a net importer of coal and oil around 2015. It will have to start energy imports on an expansion in electricity demand. If distorted domestic energy prices are left untouched, Vietnam may have great turmoil on its commencement of energy imports around 2015.

Table 3 Energy Prices in Vietnam (2006)

	Unit	VND	US\$
Domestic coal	ton	336,800	21.05
Exported coal	ton		35.7
Natural gas	million BTU		3.2
Oil-associated gas	million BTU		2.1
Gasoline	liter	10,279	0.64
Diesel oil	liter	8,029	0.50
Kerosene	liter	8,029	0.50
Fuel oil	liter	5,400	0.34
LPG	kg	14,842	0.93
Agricultural electricity	kWh	660	0.04
Industrial electricity	kWh	829	0.05
Commercial electricity	kWh	1,359	0.08
Household electricity	kWh	695	0.04
Average electricity price	kWh	789	0.05

Source: Vietnam Energy Institute

2. Energy Situation by Sector

2.1 Electricity

(1) Electricity Supply

In Vietnam, the government sets electricity prices while providing no subsidies to electricity utilities. But the government has led fuel suppliers to supply fuels (coal and gas) for power plants at lower-than-market price levels. In fact, the Electricity of Vietnam (EVN) has procured fuel at lower-than-market prices. The EVN has no cost problems at present as its average electricity sales costs are lower than average electricity tariff. (For independent power producers, known as IPPs, however, costs are higher than electricity prices.) If costs of new power plants exceed electricity prices, the EVN may have to shoulder the gap. Therefore, banks have become reluctant to provide loans to the EVN. For its part, the EVN is unwilling to promote new power plant development. This indicates that the EVN, unlike Japanese electricity utilities, is free from the electricity provision requirement. But the industrial sector hopes that new power plants would

be developed in line with the sixth power development plan to meet growing electricity demand even at the cost of electricity price hikes. This is because Vietnam's electricity tariffs are still lower than private power generation costs in the industrial sector.

There is no contract demand in Vietnam. But electricity distribution firms require commercial customers to file for "maximum demand," "minimum demand," "average demand" and "average monthly consumption" every year. If the distributors approve these figures, they are registered to make electricity supply contracts. These contracts call for a penalty of a 12% price hike for an excess above a registered level and an electricity supply suspension for an intentional excess at a peak demand. Since Vietnam ran into electricity shortages in late 2006, urban blackouts have been implemented along with scheduled blackouts (a five-day advance notice is required under the electricity law). Electricity distributors have also asked major plants to shift operations to off-peak time zones.

In January 2009, Industry and Trade Minister Vu Huy Hoang requested the EVN in official writing to maximize available output for power stations in order to prioritize electricity supply for producers of exports. The minister also asked the EVN to stabilize electricity supply by implementing scheduled blackouts through predetermined procedures to adjust loads. The EVN has thus been required to report daily electricity supply volume, supply adjustments, electricity system loads and an electricity supply plan for the coming week every Friday. Electricity utilities have been required to prepare lists of customers given priority in electricity supply and submit them to provincial or municipal people's committees for approval. If electricity utilities affect regional production operations with blackouts without prior notification, their presidents must take responsibility for such results immediately.

(2) Electricity Prices

On March 1, 2009, the average electricity price was raised by 8.92% from 2008 to 948.5 VND/kWh (excluding the value added tax). Vietnam has introduced a progressive pricing system for household electricity charges. The system includes 600 VND/kWh for the first 50 kWh, an equivalent to average costs for 51-100 kWh and 1,790 VND/kWh for 401 kWh or more. From 2010, ceiling prices will be introduced gradually for industrial and commercial electricity charges so that electricity utilities will charge ceiling or lower prices in accordance with customers' consumption volume and guidelines given by electricity adjustment organizations. A government-fixed uniform price will be charged for households in regions connected to the national grid network. Under a system for electricity subsidies to households consuming less than 50 kWh a month and poor or low-income households meeting some conditions, electricity utilities directly subtract due amounts from monthly bills for these households (as far as technically possible).

Vietnam is considering introducing a market mechanism for electricity prices on January 1, 2010. The Ministry of Industry and Trade plans to introduce a market-based electricity price adjustment mechanism in consideration of electricity utilities' generation levels, business performances and average prices while consulting with the Ministry of Finance. Under the mechanism, an electricity sales price control task force may examine the adjustment level for approval by the Minister of Industry and Trade if the level is within 5% of the average electricity sales price approved for the previous year. If the adjustment level exceeds 5% of the previous year's average price, the level may be considered by the Ministry of Industry and Trade and examined by the Ministry of Finance before approval by the premier.

In order to fix electricity prices for 2009, the government published parameters for pricing for the first time. For the year, electricity demand is estimated at 74,701 billion kWh, electricity supply (output and imports) at 85,046 billion kWh, the hydroelectric generation capacity utilization rate at 50%, a hike in the price of coal for electricity generation at 27% from 2008, the price of gas for electricity generation at \$60 per barrel in terms of oil (about \$10/mmBtu), the average diesel oil price at 11,000 VND per liter, and the average fuel oil price at 8,500 VND per liter (with the exchange rate at 17,000 VND to the U.S. dollar).

2.2 Oil

(1) Refineries

Vietnam, though producing crude oil, has no oil refinery and imports petroleum products. A refinery with crude capacity of 148,000 barrels per day is under construction in central Vietnam. The Dung Quat refinery was completed in February 2009. The second and third oil refineries are under planning. The second is planned by a joint venture (named Nghi Son Refinery & Petrochemical Limited Liability Company) of four companies – Idemitsu Kosan Co., Mitsui Chemicals Inc., Kuwait Petroleum International (KPI) and PetroVietnam (PVN). The joint venture was founded in April 2008 to build a Vietnam Nghi Son refinery/petrochemical complex in northern Vietnam. It is owned 35.1% by Idemitsu Kosan, 35.1% by KPI, 25.1% by PVN and 4.7% by Mitsui Chemicals. The joint venture is considering the basic design and economy of the complex and fundraising methods in a bid to launch the complex in 2013. The refinery/petrochemical complex is planned to cost about \$6 billion. The Japan Bank for International Cooperation's project finance is expected to cover 70% of the total cost. The third oil refinery is planned in Ba Ria Vung Tau Province, southern Vietnam. Venezuela will invest in the Long Son refinery planned to refine Venezuelan crude oil. Even if the three refineries are completed, they may fall short of meeting all petroleum product demand in Vietnam. Vietnam will thus continue importing petroleum products. Vietnam, though being a net oil exporter at present, is expected to turn into a net importer around 2015.

(2) Gasoline Prices

Vietnam now imports petroleum products meeting all domestic demand so that their prices are at international levels. The basic price of gasoline stood at 13,000 VND per liter (about US\$0.9) in November 2008 after peaking at 18,000 VND per liter. When the crude oil price remained high, Vietnam dipped into its own fund and eliminated import duties to help curb a gasoline price hike. In a bid to address oil price fluctuations as seen over recent years, the premier has asked the Ministries of Finance, and Industry and Trade to take measures to secure the guidance and control of gasoline and other petroleum product prices amid international price fluctuations and a market mechanism in which the government would be involved to some extent.

Retail gasoline prices are now controlled by the government. The recent fast fall in crude oil prices has prompted consumers to expect a drop in gasoline prices. The gasoline price usually includes a 25% import duty, a 10% special consumption tax, a 10% value added tax, 1,000 VND in gasoline/oil fees, 1,000 VND in payments to help cover budget deficits, and 500 VND for a price stabilization fund. Controlled prices at present are lower than their combination. In January 2009, the retail price stood at 11,000 VND per liter for regular gasoline and 10,500 VND per liter for diesel oil.

2.3 Gas

Vietnam has had a short history for gas development. Its gas industry emerged through the development of associated gas from the Bach Ho oilfield in mid-1990 and an offshore gas field in Nam Con Son in 2001. Vietnam features a large number of small gas fields, forcing a great number of wells to be dug at higher costs. But Vietnam's gas prices are the lowest in Southeast Asia excluding Malaysia that has implemented a policy to limit gas prices. At the Bach Ho oilfield for Vietnam's first gas utilization, PVN's price of associated gas for sales to the EVN is estimated at \$2-3/mmBtu for 2007. Such low gas prices have worked to curb investment.

2.4 Coal

(1) Coal Prices

Vietnam uses the greater part of coal supply for electricity generation. The remainder is used at cement, brick, paper, and fertilizer plants. Vietnam, though exporting coal at present, will become a coal importer around 2015 on an increase in electricity demand. Coal prices for power plants are 30% less than domestic market prices and 50% less than export prices. The Vietnam National Coal-Mineral Industries Group, known as Vinacomin, is required to provide coal to power plants at lower prices. In the Finance Ministry's report No. 191, given to the government for submission to the Standing Committee of the National Assembly in January 2009, electricity, coal and clean water prices as well as bus fares were planned to remain subject to the market mechanism. A week later, however, the Ministry of Industry and Trade proposed to postpone

electricity and coal price hikes. According to the domestic market control task force, Vietnam's social purchasing power has declined with production stagnating as inflation factors have remained to be resolved. If electricity and coal prices are raised as scheduled, prices for a large number of other goods may be increased to further reduce social purchasing power. A shift to the market mechanism for prices of coal for electricity generation has been rumored since 2008. But these prices are still kept at lower levels. The government says it plans to equalize prices of coal for electricity generation with market levels within the 2010-2012 periods. But coal industry people may not be expecting the plan to be implemented.

In November 2008, the Ministry of Finance approved hikes in prices of coal for cement, paper and fertilizer industries to help cover costs at Vinacomin. Even after the hikes, however, these prices are still below market levels. Coal prices for fertilizers are limited to 81% of total production costs. In the four biggest coal-consuming regions, coal prices are set at 38% to 79% of production costs depending on the coal category. In regions where coal consumption is limited, coal prices are set at even lower levels. In the second quarter of 2009, coal prices for cement, paper and fertilizer industries are scheduled to rise to market levels. According to the Ministry of Finance, a shift to the market mechanism in 2009 could accelerate coal price hikes for the three industries. For some coal categories, price hikes could exceed 100%.

(2) Coal Thermal Power Plant Projects

In the 7469/VPCP-KTN official document on November 3, 2008, Deputy Premier Hoang Trung Hai asked the Ministry of Industry and Trade to submit guidelines for 13 coal thermal power station projects. The 13 projects and their present conditions follow:

Table 4 Current Status of Coal Thermal Power Station Projects

Power Station Name	Present Conditions
Mong Duong 1	The EVN has been committed to taking investment procedures to launch construction in the fourth quarter of 2009.
Mong Duong 2	The EVN and the U.S. AES Group plan to complete procedures for an investment approval certificate within the first quarter of 2009.
Thai Binh 1 and 2	The EVN and Vinacomin are planned to start construction.
Nghi Son 1	The Thanh Hoa Province People's Committee has proceeded with eviction and compensation procedures regarding the project. It made a report to the premier at the end of January 2009.
Nghi Son 2	The Ministry of Industry and Trade has issued an investment certificate and is proceeding with bidding procedures.
Vung Ang 1 and 2	The Ministry of Industry and Trade has provided project planners with the relevant guidelines.
Vinh Tan 1 and 2	The Ministry of Industry and Trade has asked China Southern Power Grid (CSG) to report preparations for the project and provided CSG with guidelines for the creation of a stock company, engineering

	surveys, investment project development and electricity sales contract negotiations.
Vinh Tan 3	The Ministry of Industry and Trade has provided guidelines for completing investment procedures to a stock company owned by the EVN, One Energy and Pacific Investment and Service Corp.
Duyen Hai 2	Project investment procedures have been completed. Guidelines for preparations for construction have been provided to Malaysia's Janakusa.
Duyen Hai 1	The EVN completed investment procedures in early 2009 and is preparing for construction.

Source: Vietnam Legal News No.3/2009 (January 20, 2009)

(3) New Technology Topics

Marubeni Corp. has joined hands with Vietnam's state coal company and an Australian firm to conduct demonstration tests of a next-generation technology to gasify coal before extraction under the ground. The demonstration tests will be implemented in the Red River Delta in a suburb of Hanoi. The underground coal gasification technology is designed to ignite underground coal seam and extract synthetic gas emerging from burning coal through holes. This technology will reportedly eliminate the need for coal gasification furnaces and work to reduce initial coal development costs

2.5 Energy Efficiency and Conservation

(1) Energy Efficiency and Conservation Law

Vietnam has been preparing energy efficiency and conservation law since early 2008. It had initially intended to submit the law to the National Assembly in late 2008 and get the assembly's approval after its deliberation in 2009. But the preparation of details and ordinances has been delayed. As of March 2009, the preparation has yet to be completed. At present, the government plans to submit the law to the National Assembly in May 2009. But the plan will further delay. The draft energy conservation law would require all manufacturers to report energy consumption volume and exert a penalty on those failing to do so. It would also require designated manufacturers, and corporate and personal building owners and users to conduct an energy audit every three years. A regulation in 2001 required energy-intensive companies to submit energy consumption reports. But the regulation failed in the absence of any penalty.

The energy efficiency and conservation law targets manufacturers put under the Ministry of Industry and Trade, buildings under the Ministry of Construction and the transportation sector under the Ministry of Transportation. It is under consideration by an expert panel. In addition to the three ministries, the General Statistics Office has joined the preparation of the law as a collector of data. The roles of each government agency and enterprise under consideration for the energy efficiency and conservation law are as follows:

Figure 5 Roles of Government Agencies and Enterprises

Competent bodies	Roles
General Statistics Office(GSO)	- Issuance of periodical report to all manufacturers - Collection of periodical report
Ministry of Industry and Trade (MOIT)	- Preparation and updating (annual) of lists of designated enterprises - Preparation of periodical report, implementation report and five-year plan - Evaluation of implementation report and five-year plan, and relevant feedback to businesses.
Ministry of Construction (MOC)	- Preparation and updating (annual) of lists of designated buildings. - Preparation of forms for periodical report, implementation report and five-year plan. - Evaluation of implementation report and five-year plan, and relevant feedbacks to businesses.
Ministry of Transportation (MOT)	- Preparation and updating (annual) of lists of designated transportation businesses - Preparation of forms for periodical report, implementation report and five-year plan. - Evaluation of implementation report and five-year plan, and relevant feedback to businesses.
All manufacturers	- Submission of periodical reports
Designated businesses	- Preparation and submission of periodical report and implementation report. - Submission of five-year plan (every five years)

Source: Draft Energy Efficiency and Conservation Law

The energy efficiency and conservation goals are a 3-5% cut in cumulative energy consumption between 2006 and 2010 and a 5-8% cut in cumulative energy consumption between 2011 and 2015. At present, however, business-as-usual consumption levels have yet to be fixed. Evaluation standards may be a problem.

(2) Energy Conservation Center

Energy conservation centers have been established by the government or provincial peoples' committees in Hanoi, Ho Chi Minh City, Phu Tho and other cities. Unlike similar centers in Japan, these centers have not been unified. The Ho Chi Minh City center founded by the People's Committee in 2002, the Hanoi center established by the Ministry of Industry and Trade in 2007 and the Phu Tho center established by the People's Committee in 2008 have been very active. Other energy conservation centers have conducted no effective operations. These energy conservation centers implement energy conservation promotion operations and "energy conservation diagnoses" for nearby factories and business offices. Each energy conservation center has had financial difficulties as government subsidies (for government-assigned operations) cover only a small part of overall costs. At present, the Ho Chi Minh City center plays a leading role. But the government has not necessarily designed the Ho Chi Minh City center to do so. The Ministry of Industry and Trade plans to establish its own energy conservation centers at various points in the country and network eight centers including the three active ones.

2.6 Environment

Air pollution by exhaust gas from vehicles has become a major problem in urban regions. As the EURO2 exhaust emissions requirements have been introduced since 2007, the construction of vehicle testing facilities has been delayed. Automakers are thus required to have their vehicles tested at overseas testing facilities and receive relevant certificates. But some could have reportedly obtained certificates without actual tests. Vietnam has no inspection system for motorcycles. It is difficult for Vietnam to curb exhaust gas from motorcycles. Exhaust gas from more than 20 million motorcycles has become a serious problem. Furthermore, it is difficult to know the actual number of vehicles in operation since Vietnam, though having a registration system for four- and two-wheel vehicles, has no system for reporting their retirement. Vietnam Register plans to implement a three-year plan to build 150 exhaust gas test stations in Ho Chi Minh City and 100 in Hanoi to inspect older motorcycles. No government subsidies are expected for the construction, which will be supported by private enterprises.

Regarding fuel standards, Vietnam has set qualitative guidelines for gasoline in consideration of environmental pollution, health and safety and introduced the EURO2 requirements (limiting the sulfur content to 500 ppm) since July 1, 2007. According to the Swiss-Vietnamese Clean Air Program, atmospheric carbon monoxide and nitrogen contents in urban regions exceeded maximum permissible levels under environmental standards as of September 2006. Carbon dioxide contents were two to three times as high as the maximum permissible level. A survey on motorcycles' compliance with environmental standard under the program found that 59% of motorcycles in Hanoi failed to meet the government-fixed EURO2 requirements. Vietnam is now planning to shift from EURO2 to EURO4 regarding the fuel standards. Since most vehicle engines in Vietnam are imports, it may be able to make such rapid shift rather than a gradual shift to EURO3 and then to EURO4.

3. Conclusion

Vietnam has reached a turning point regarding energy prices and supply/demand. Although energy prices had long been controlled under the communist ideology, last year's high crude oil prices forced Vietnam to set petroleum product prices at levels close to market levels because of its full dependence on imports for petroleum product supply. The fast energy demand expansion over the past years is forcing Vietnam to become a net importer of oil and coal in the near future. Unless coal and gas prices as well as petroleum product prices are raised to international market levels, Vietnam may lose its competitiveness in energy security. Vietnam will also have to promote energy conservation and new energy in order to curb energy consumption and maintain the environment while keeping high economic growth. In Vietnam, many relevant laws and regulations have been approved by the premier and reportedly failed to be enforced effectively. In the future, Vietnam will be urged to come up with an enforceable energy policy for

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energy security.

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